A30.E289
JACC March 9, 2010
Volume 55, issue 10A

CARDIAC FUNCTION AND HEART FAILURE

CENTRAL SLEEP APNEA EVENTS ARE TERMINATED BY PHRENIC NERVE STIMULATION

ACC Poster Contributions
Georgia World Congress Center, Hall B5
Monday, March 15, 2010, 9:30 a.m.-10:30 a.m.

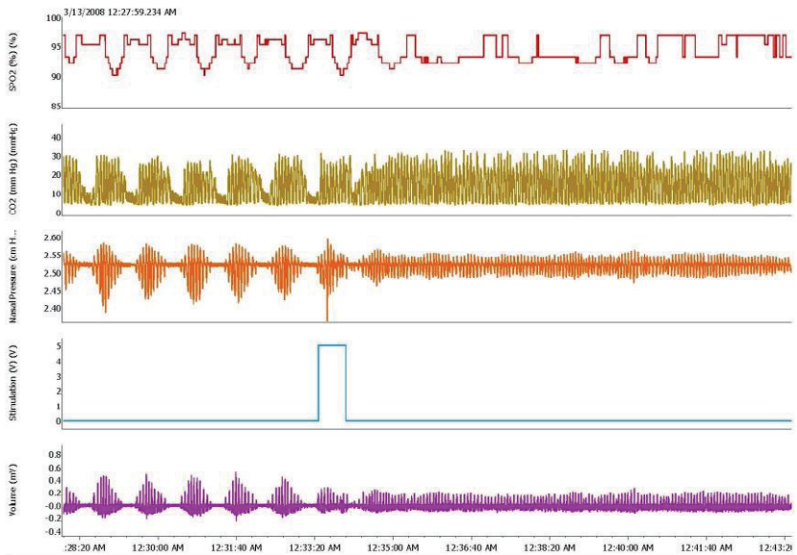
Session Title: Nonpharmacologic Therapies for Heart Failure
Abstract Category: Myocardial Function/Heart Failure--Clinical Nonpharmacological Treatment
Presentation Number: 1126-84

Authors: *Piotr Ponikowski, Shi-Jiang Zhang, Thomasz Witkowski, Ayesha Hasan, Rami Khayat, Bradley Bart, Dariusz Jagielski, Xilong Zhang, Center for Heart Disease - Clinical Military Hospital, Wroclaw, Poland, Jiangsu Provincial People's Hospital, Nanjing, People's Republic of China*

Background: Central Sleep Apnea (CSA) is often present in patients with chronic heart failure (CHF) and is associated with increased mortality. Phrenic nerve stimulation can be used to modulate diaphragmatic contraction and affect breathing. We hypothesized that stimulation of the phrenic nerve during a central event could be used to initiate inspiration or increase inspiratory time, halting or preventing the apnea.

Methods: 14 patients (mean EF = 42.2 %, NYHA II = 57 %) underwent implantation of a LassoTM catheter into the right brachiocephalic vein or superior vena cava. Four initial patients underwent implantation to evaluate the proof of concept. Ten additional subjects were studied to determine the effect of stimulation on CSA . The placement of the Lasso could not be maintained in four patients. Phrenic nerve stimulation was performed during periods of CSA at low current levels (<10mA) in the 6 subjects with stable Lasso placement.

Results: In the 10 subjects studied, the ability to stimulate the phrenic nerve transvenously was demonstrated and was tolerated while sleeping without safety issues. In the 6 patients that underwent stimulation during central events there was an improvement in CSA. A normal breathing pattern was restored and/or there was an improvement in oxygenation.



Conclusions: Phrenic nerve stimulation is able to safely break periods of central apnea during sleep and restore normal breathing patterns in patients with CHF and CSA. This approach may represent a novel treatment for CSA.